This listing of the claims replaces all prior versions in the application.

Listing of Claims:

1. (Currently Amended) A method of flowably dispensing pharmaceutical dry powder[[s]] from a hopper during a filling operation, the hopper having a dispensing port and a dry powder flow path, comprising:

generating a first non-linear vibration input signal, the first non-linear input signal comprising a carrier frequency modulated by a plurality of different selected frequencies that correspond to a first dry powder formulation;

applying the first non-linear vibration input signal to a dispensing hopper having a dry powder flow path and at least one dispensing port while the first dry powder formulation is flowing therethrough; and

dispensing a first meted quantity of the first dry powder through the dispensing port to a receiving member.

2. (Original) A method according to Claim 1, wherein the selected frequencies of the non-linear signal correspond to known and/or predetermined flow characteristic frequencies of the first dry powder, and wherein the generating step is carried out to cause the dry powder to flow in a substantially uniform fluidic manner without aggregation.

3. (Original) A method according to Claim 2, wherein the dispensing step is carried out by synchronizing the dispensing port to open for a predetermined amount of time, the time corresponding to the dry powder flow rate and amount of meted dry powder desired.

4. (Original) A method according to Claim 1, wherein the first meted quantity is a single unit dose amount that is less than about 15mg.

5. (Original) A method according to Claim 1, wherein the first meted quantity is a single unit dose amount that is between about 10μg-10mg.

6. (Original) A method according to Claim 1, wherein the dispensing step is carried out to successively dispense a plurality of meted quantities, the plurality of meted quantities being between about 10μg-10mg, and wherein each of the plurality of meted quantities are in substantially the same amount with a variation dose to dose of less than about 10%.

7. (Original) A method according to Claim 6, wherein the dose to dose variation is less than about 5%.

8. (Original) A method according to Claim 1, wherein the non-linear input signal has a plurality of superpositioned modulating frequencies.

9. (Original) A method according to Claim 1, wherein the dry powder formulation is a low-density dry powder formulation.

10. (Original) A method according to Claim 1, wherein the input signal is derived from an evaluation of observed frequencies of time between avalanches as detected in a mass flow analysis of the dry powder formulation.

11. (Original) A method according to Claim 10, wherein the derivation of the input signal converts time to frequency space to render frequency distribution data of the mass flow analysis of the dry powder formulation.

12. (Currently Amended) A method according to Claim 1, further comprising generating a second non-linear vibration input signal, the second non-linear input signal comprising a <u>second carrier frequency and a</u> plurality of different selected signal frequencies that correspond to predetermined flow characteristics of a second dry powder formulation;

adjusting the non-linear input signal to apply a second non-linear vibration input signal to the dispensing hopper while the second dry powder formulation is

flowing therethrough, the second input signal being different from the first input signal; and

dispensing a first meted quantity of the second dry powder through the dispensing port to a receiving member.

13. (Withdrawn) A method according to Claim 1, wherein the applying step is carried out at a localized portion of the hopper.

14. (Original) A method according to Claim 1, wherein the applying step is carried out by applying the non-linear vibration energy along a major portion of the length of the hopper, the length of the hopper extending in the direction of flow.

15. (Original) A method according to Claim 12, wherein the non-linear input signal comprises a plurality of superimposed frequencies that are selected to represent a desired number of the most observed frequencies in a flow analysis frequency distribution.

16. (Original) A method according to Claim 1, wherein the applying step is carried out to concurrently apply vibrational energy at multiple selected frequencies.

17. (Original) A method according to Claim 1, further comprising increasing the apparent bulk density of the first dry powder during the dispensing step without evacuating the flow path.

18. (Withdrawn) A method according to Claim 17, wherein the hopper and dispensing port define a dry powder flow path, and wherein the increasing the apparent density step comprises directing a gas at a first pressure to enter, flow across, and exit the flow path at a second lesser pressure, proximate the dispensing port as the dry powder moves downwardly in the hopper during the dispensing step.

19. (Original) A method according to Claim 1, wherein the hopper has an associated axis extending along the gas flow path, said method further comprising moving the hopper in a centrifugal motion so that it oscillates relative to the axis and generates a force with downward component or vector that is transmitted to the first dry powder formulation during the dispensing step.

20. (Original) A method according to Claim 1, wherein the hopper has an associated axis extending along the gas flow path, said method further comprising moving the hopper in an eccentric motion so that it oscillates relative to the axial center line and generates a force with downward component or vector that is transmitted to the first dry powder formulation during the dispensing step.

21. (Original) A method according to Claim 1, wherein the non-linear input signal comprises frequencies in the range of between about 10Hz to 1000kHz.

22. (Original) A method according to Claim 1, wherein the non-linear input signal comprises carrier frequencies in the range of between about 15kHz to 50kHz.

23. (Withdrawn) A method according to Claim 1, wherein the hopper comprises an insert configured to reside in the flow path in the hopper such that it downwardly extends a distance out of the dispensing port, said method further comprising translating the insert during the dispensing step to accelerate the particles of the dry powder formulation.

24. (Withdrawn) A method according to Claim 23, wherein the translating step is carried out to oscillate the insert with a selected motion that has an associated non-constant period or periods.

25. (Original) A method according to Claim 1, wherein the vibration energy input signal is based on electrical stimulation of the hopper.

26. (Original) A method according to Claim 1, wherein the vibration energy input signal is generated by mechanical stimulation of the dry powder.

27. (Original) A method according to Claim 1, wherein the vibration energy input signal is generated by electro-mechanical stimulation of the hopper and/or dry powder.

28. (Original) A method according to Claim 1, wherein the vibration energy input signal comprises imparting a high frequency motion onto a selected portion of the hopper, with the outer bounds of the motion of the hopper being small.

29-54. (Canceled)

55-64 (Canceled)

65-71 (Canceled)

72-73 (Canceled)

74. (Previously Presented) A method according to Claim 1, wherein the first meted quantity is a single unit dose amount of a pharmaceutical dry powder.

75-76 (Canceled)

77. (New) A method of operating a dry powder filling system for dispensing pharmaceutical grade formulations of inhalable dry powder substances to target receiving members, comprising:

generating a vibratory signal comprising a carrier frequency modulated by a plurality of selected frequencies to dry powder in a bulk powder enclosure having a dispensing flow path, the selected frequencies corresponding to identified *a priori* flow characteristic frequencies of the dry powder; and

dispensing meted quantities of the dry powder using the generated vibratory signal.

78. (New) A method according to Claim 77, wherein the vibratory signal is an amplitude modulated non-linear signal that superimposes the selected flow characteristic frequencies.

79. (New) A method according to Claim 77, wherein the modulating flow characteristic frequencies comprise at least about three different frequencies in the range of between about 10Hz to 1000kHz.

80. (New) A method according to Claim 79, wherein the carrier frequency is between about 15kHz to 50kHz.

81. (New) A method according to Claim 77, wherein the *a priori* flow characteristic frequencies correspond to observed frequencies in an avalanche-analysis spectrum of the dry powder.

82. (New) A method according to Claim 81, wherein the selected flow characteristic frequencies include a plurality of predominant observed frequencies

83. (New) A method according to Claim 77, wherein the selected modulating frequencies are amplitude weighted.

84. (New) A method according to Claim 81, wherein the non-linear vibratory signal "x_{signal}" is a cumulative signal that comprises a sum of selected observed frequencies derived from an avalanche-analysis spectrum of the dry powder.

85. (New) A method according to Claim 84, wherein the non-linear input signal "x_{signal}" is derived from the mathematical equation:

$$x_{signal} = xf_2 + xf_3 + xf_4 + \ldots xf_n$$

where f_2, f_3, f_4... f_n, respectively, correspond to most observed frequencies in an avalanche-based analysis spectrum of the dry powder and the parameter "x" used with f_2, f_3, f_4, f_n is a variable representing amplitude weight for a respective observed frequency.

86. (New) A method according to Claim 85, wherein one or more of the weighted summed frequency components is multiplied by a mathematical phase adjustment.

87. (New) A method according to Claim 85, wherein f_2, f_3, f_4 are the most observed frequencies in an avalanche-based analysis spectrum of the dry powder.

88. (New) A method according to Claim 77, wherein the system is configured to dispense a plurality of different dry powders, and wherein the generating step is configured to selectively generate a plurality of different vibratory signals, each different vibratory signal comprising a carrier frequency modulated by a plurality of selected frequencies, the selected frequencies corresponding to *a priori* flow characteristic frequencies identified in a flow analysis of the respective dry powder being dispensed.

89. (New) A method according to Claim 88, further comprising filling at least two different pharmaceutical agents during dose filling using the applied vibratory signal.

90. (New) A method of flowably dispensing production batches of pharmaceutical dry powders from a hopper having a dispensing port and a dry powder flow path, comprising:

generating a first vibration input signal, the first input signal comprising a carrier frequency modulated by at least one selected frequency, the selected frequency generally corresponding to one of a plurality of *a priori* identified flow characteristic frequencies of a particular dry powder being dispensed;

applying the first vibration input signal to the dry powder while the first dry powder formulation is flowing so that the first input signal vibrates the powder in a flow path to facilitate fluidic flow of the dry powder; and

serially dispensing meted quantities of the first dry powder to at least one receiving member, wherein a dose to dose variation of the meted quantities is less than about 5%.

91. (New) A method according to Claim 90, wherein the at least one selected frequency is at least three selected frequencies.

92. (New) A method according to Claim 90, wherein the dose to dose variation is substantially about 2% or less.

93. (New) A method of flowably dispensing pharmaceutical dry powder(s) from a hopper and/or dry powder flow path that merges into a dispensing port comprising:

generating a first non-linear vibration input signal, the first non-linear input signal comprising a carrier frequency modulated by a plurality of different selected frequencies, the different selected frequencies corresponding to flow characteristic frequencies derived from a flow analysis of a dry powder formulation targeted for dispensing;

applying the first non-linear vibration input signal to the dry powder while the dry powder formulation is flowing; and

dispensing meted quantities of the first dry powder through a dispensing port to a receiving member.

94. (New) A method according to Claim 93, wherein a dose to dose variation of the meted quantities is about 5% or less.

95. (New) A method according to Claim 93, wherein a dose to dose variation of the meted quantities is about 2% or less.